THE DIABETES AWARENESS GROUP

Daniel Gregory Torba

An Integrative Service Project Summary submitted to the University of Utah in partial fulfillment of the requirements of the Service-Learning Scholar's Program through the Lowell Bennion Community Service Center

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E. Dale Abel MD Ph.D., Faculty Advisor, Division of Endocrinology Metabolism and Diabetes

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Jamie Ney, Community Partner, ABC Kiddy World, East High School

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JaNae Lilly, Bennion Center Representative, Service-Learning Scholar Coordinator

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James Lee, Student Member, University of Utah School of Medicine

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ABSTRACT

Through my studies and past experiences with sports and nutrition I have learned that I have something to offer the community. After spending time volunteering in various service activities I decided I wanted to focus my efforts and start a student group. I have since started the Diabetes Awareness Group at the University of Utah and have been working to make the group sustainable. Our mission is to better educate the importance of health and exercise and its role in the prevention of diabetes. We reach out and teach in the community, at local elementary and middle schools, and high schools. In understanding that beating a disease comprises both of prevention for the non-ill, as well as helping to find a cure, we have incorporated a fundraising project as a way of raising money for diabetes research at the University of Utah. We hope that our efforts will inspire a more healthy way of living for those in our community.

REVIEW OF LITERATURE

The Abel lab's current research focuses on elucidating the molecular mechanisms leading to cardiac dysfunction in diabetes and the regulation of myocardial growth and metabolism by insulin signaling. The American Diabetes Association discusses some of Dr. Abel's current research interests including,

"*Treating diabetic cardiomyopathy by modulating myocardial glut4 expression.*"

> Heart disease is the leading cause of death in persons with diabetes. One of the problems that develop in diabetic hearts is a reduced ability of the heart to use glucose and increased reliance on fat. Glucose provides an important source of energy for the heart, particularly under circumstances when blood flow to the heart is reduced (cardiac ischemia) as occurs when coronary arteries are occluded. The study will test the theory that if glucose uptake into the heart can be increased in diabetics, then those hearts will have improved function and will resist injury during times of cardiac ischemia. We have generated a novel mouse model with a genetic switch that allows us to turn on and increase the expression of a glucose transport protein (GLUT4) in the heart. We will use these animals to show that even in diabetic animals, if we can increase the levels of GLUT4 protein in the heart, we will be able to increase the amount of glucose that the heart uses, thereby improving cardiac function and limiting ischemic damage. If we show that increased glucose use in the heart can restore heart function in diabetics, then drugs or other interventions that increase the levels of GLUT4 in the heart might become a valuable approach for treating heart disease in patients with diabetes.
>
> (Abel, 2008)

As a member of the Abel team, I felt a part of something bigger than myself. Starting behind the knowledge curve, I knew that if I were going to do well I was going to have to work hard. Being responsible for the genotyping in the lab, I performed DNA digestions, Polymerase Chain Reaction Assays, and Gel Electrophoresis analyses to determine which mice are transgenic and which are wild types for the 45 different colonies. Genotyping is very monotonous, but I realized how critical it was to the lab, and thus took my job very seriously. I felt a great deal of reciprocity; I made a positive contribution to the lab and also learned a great deal in return. I learned to accept criticism by understanding that there is something to be learned from each mistake. Though there were many rewards to working in the lab, the most invaluable lesson I learned was how to manage time. My experience in the lab taught me how to work efficiently, so that I can manage my time without sparing the quality of my work.

According to the NDIC, "23.6 million people have diabetes" (National Diabetes Information Clearinghouse (NDIC)). The Diabetes Awareness group would like to help. As seen on the Diabetes Awareness Group's website, *DiabetesAwarenessGroup.org*, the National Center for Chronic Disease Prevention and Health Promotion Division of Diabetes Translation has permitted us to share with you valuable knowledge and information on diabetes in their, "*National diabetes fact sheet*".

National Diabetes Fact Sheet

What is diabetes?

Diabetes mellitus is a group of diseases characterized by high levels of blood glucose resulting from defects in insulin production, insulin action, or both. Diabetes can be associated with serious complications and premature death, but people with diabetes can take steps to control the disease and lower the risk of complications.

Types of diabetes

Type 1 diabetes was previously called insulin-dependent diabetes mellitus (IDDM) or juvenile-onset diabetes. Type 1 diabetes develops when the body's immune system destroys pancreatic beta cells, the only cells in the body that make the hormone insulin that regulates blood glucose. This form of diabetes usually strikes children and young adults, although disease onset can occur at any age. Type 1 diabetes may account for 5% to 10% of all diagnosed cases of diabetes. Risk factors for type 1 diabetes may include autoimmune, genetic, and environmental factors.

Type 2 diabetes was previously called non-insulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes. Type 2 diabetes may account for about 90% to 95% of all diagnosed cases of diabetes. It usually begins as insulin resistance, a disorder in which the cells do not use insulin properly. As the need for insulin rises, the pancreas gradually loses its ability to produce insulin. Type 2 diabetes is associated with older age, obesity, family history of diabetes, history of gestational diabetes, impaired glucose metabolism, physical inactivity, and race/ethnicity. African Americans, Hispanic/Latino Americans, American Indians, and some Asian Americans and Native Hawaiians or Other Pacific Islanders are at particularly high risk for type 2 diabetes. Type 2 diabetes is increasingly being diagnosed in children and adolescents.

Gestational diabetes is a form of glucose intolerance that is diagnosed in some women during pregnancy. Gestational diabetes occurs more frequently among African Americans, Hispanic/Latino Americans, and American Indians. It is also more common among obese women and women with a family history of diabetes. During pregnancy, gestational diabetes requires treatment to normalize maternal blood glucose levels to avoid complications in the infant. After pregnancy, 5% to 10% of women with gestational diabetes are found to have type 2 diabetes. Women who have had gestational diabetes have a 20% to 50% chance of developing diabetes in the next 5-10 years.

Other specific types of diabetes result from specific genetic conditions (such as maturity-onset diabetes of youth), surgery, drugs, malnutrition, infections, and other illnesses. Such types of diabetes may account for 1% to 5% of all diagnosed cases of diabetes.

Treating diabetes

- To survive, people with type 1 diabetes must have insulin delivered by injections or a pump.
- Many people with type 2 diabetes can control their blood glucose by following a careful diet and exercise program, losing excess weight, and taking oral medication.
- Many people with diabetes also need to take medications to control their cholesterol and blood pressure.
- Diabetes self-management education is an integral component of medical care.
- Among adults with diagnosed diabetes, 12% take both insulin and oral medications, 19% take insulin only, 53% take oral medications only, and 15% do not take either insulin or oral medications.

Treatment with insulin and oral medications—United States, 1999-2001

Prediabetes: Impaired glucose tolerance and impaired fasting glucose

•Prediabetes is a term used to distinguish people who are at increased risk of developing diabetes. People with prediabetes have impaired fasting glucose (IFG) or impaired glucose tolerance (IGT). Some people may have both IFG and IGT.

•IFG is a condition in which the fasting blood sugar level is elevated (100 to 125 milligrams per deciliter or mg/dL) after an overnight fast but is not high enough to be classified as diabetes.

•IGT is a condition in which the blood sugar level is elevated (140 to 199 mg/dL) after a 2-hour oral glucose tolerance test, but is not high enough to be classified as diabetes.

•In a cross-section of U.S. adults aged 40-74 years who were tested from 1988 to 1994, 33.8% had IFG, 15.4% had IGT, and 40.1% had prediabetes (IGT or IFG or both). Were these percentages applied to the 2000 U.S. population, about 35 million adults aged 40-74 would have IFG, 16 million would have IGT, and 41 million would have prediabetes.

•Progression to diabetes among those with prediabetes is not inevitable. Studies suggest that weight loss and increased physical activity among people with prediabetes prevent or delay diabetes and may return blood glucose levels to normal.

•People with prediabetes are already at increased risk for other adverse health outcomes such as heart disease and stroke.

Prevention or delay of diabetes

Research studies have found that lifestyle changes can prevent or delay the onset of type 2 diabetes among high-risk adults. These studies included people with IGT and other high-risk characteristics for developing diabetes. Lifestyle interventions included diet and moderate-intensity physical activity (such as walking for 2 1/2 hours each week). In the Diabetes Prevention Program, a large prevention study of people at high risk for diabetes, the development

of diabetes was reduced 58% over 3 years.

Studies have also shown that medications have been successful in preventing diabetes in some population groups. In the Diabetes Prevention Program, people treated with the drug metformin reduced their risk of developing diabetes by 31% over 3 years. Treatment with metformin was most effective among younger, heavier people (those 25-40 years of age who were 50 to 80 pounds overweight) and less effective among older people and people who were not as overweight. Similarly, in the STOP-NIDDM Trial, treatment of people with IGT with the drug acarbose reduced the risk of developing diabetes by 25% over 3 years. Other medication studies are ongoing. In addition to preventing progression from IGT to diabetes, both lifestyle changes and medication have also been shown to increase the probability of reverting from IGT to normal glucose tolerance

There are no known methods to prevent type 1 diabetes. Several clinical trials are currently in progress or being planned.

Prevention of diabetes complications

Diabetes can affect many parts of the body and can lead to serious complications such as blindness, kidney damage, and lower-limb amputations. Working together, people with diabetes and their health care providers can reduce the occurrence of these and other diabetes complications by controlling the levels of blood glucose, blood pressure, and blood lipids and by receiving other preventive care practices in a timely manner.

Glucose control

- Research studies in the United States and abroad have found that improved glycemic control benefits people with either type 1 or type 2 diabetes. In general, for every 1% reduction in results of A1C blood tests (e.g., from 8.0% to 7.0%), the risk of developing

microvascular diabetic complications (eye, kidney, and nerve disease) is reduced by 40%.

Blood pressure control

•Blood pressure control can reduce cardiovascular disease (heart disease and stroke) by approximately 33% to 50% and can reduce microvascular disease (eye, kidney, and nerve disease) by approximately 33%.

•In general, for every 10 millimeters of mercury (mm Hg) reduction in systolic blood pressure, the risk for any complication related to diabetes is reduced by 12%.

Control of blood lipids

•Improved control of cholesterol or blood lipids (for example, HDL, LDL, and triglycerides) can reduce cardiovascular complications by 20% to 50%.

Preventive care practices for eyes, kidneys, and feet

•Detecting and treating diabetic eye disease with laser therapy can reduce the development of severe vision loss by an estimated 50% to 60%.

•Comprehensive foot care programs can reduce amputation rates by 45% to 85%.

•Detecting and treating early diabetic kidney disease by lowering blood pressure can reduce the decline in kidney function by 30% to 70%. Treatment with ACE inhibitors and angiotensin receptor blockers (ARBs) are more effective in reducing the decline in kidney function than other blood pressure lowering drugs.

(National Center for Chronic Disease Prevention and Health Promotion Division of Diabetes Translation (CDC))

PROCEDURE

Working in diabetes research for three years gave me the idea to start a student group that would promote diabetes awareness and research. These were the steps I took to get the group up and running:

ASUU: The Associated Students at the U of U (ASUU) is in charge of all student groups at the University of Utah. All student groups must have a minimum of 3 members and a faculty advisor. I thus recruited other ambitious colleagues of mine who were interested in diabetes awareness and asked Dr. Abel to be my advisor. To become an official student group at the University of Utah one must first file the necessary paperwork with ASUU. This consists of creating a constitution, mission statement, and budget for your group. The Constitution is the bylaws of the group. The mission statement is the overall purpose behind the group and the budget is an anticipated spending report for the upcoming year. This is the Constitution I filed with ASUU:

Diabetes Awareness Group

Constitution

Adopted on September 23, 2008

We cannot overcome that in which we are not aware.

Article I –Name

Diabetes Awareness Group at the University of Utah and Eccles Institute of Human Genetics

Article II –Purpose

Our mission is to better educate the importance of health and exercise and its role

in the prevention of diabetes through means of community outreach. In understanding that beating a disease comprises of both means of prevention for the non-ill as well as means for a cure, we will be incorporating a fundraising project as a way to raise money for diabetes research at the University of Utah.

Article III –Membership

A) Any persons wishing to join the Diabetes Awareness group are qualified for membership being they are a student or faculty member and have pertinent interest in the mission of the group.

B) To be recognized as a full member of the Diabetes Awareness Group one must commit to the charitable fundraising project and meet his or her agreed upon quota in which we will contribute to Diabetes Research at the University of Utah.

C) Any member has the right to propose a novel means of community outreach with the initiative of Diabetes Awareness. Members of the group will be recognized on the Diabetes Awareness Group website.

Article IV –Meeting

A) Meetings are to be held on Thursdays in the student Union at 6:00PM. Meetings may not be held every Thursday but will be held at least once every month.

B) Members will be notified of times and destination of the meetings via email.

Article V –Executive Board

Advisor)

Dale Abel, M.D., Ph.D.
Dale.abel@hmbg.utah.edu

President)

Daniel Torba
Dtorba@mac.com

Vive President)

Noah Wride
Noah.wride@gmail.com

Officer)

James Lee
Jamesplee15@yahoo.com

Article VI –Elections

Officers are to be appointed by the president. Anyone who shows assiduousness in their community outreach efforts pertaining to the Diabetes Awareness Group may be worthy of officer standing.

Article VII –Funds

Funds are to be allocated by through the ASUU budget process. Other avenues of funding resources are welcomed.

Article VIII –Committees

Committees may cohort if it is in the interest of the Diabetes Awareness group and its mission.

Article IX –Affiliations

The Diabetes Awareness group is affiliated with the University of Utah and Eccles Institute of Human Genetics being that one must be a student or faculty member.

Article X –Advisor

The advisor serves as a mentor for the group and has power to oversee and direct the actions of the Diabetes Awareness group thereof in its best interest.

Article XI –Ratification

The constitution may be ratified at any moment if it is to better the direction and purpose of the Diabetes Awareness Group

Article XII –Amendments

Amendments may be presented at any meeting and may in just ratification if it is to better the direction and purpose of the Diabetes Awareness Group

Article XIII –Bylaws

Bylaws may be instated to improve the overall utility and functionality of the Diabetes Awareness Group

Receiving Funding From ASUU: To receive money for your student group one must go through one of two methods with ASUU. The first is to submit a budget and get it approved; the second is to create a bill and have it passed through ASUU assembly. We decided to do both. After creating and submitting our budget we asked members of the ASUU staff to support our proposed bill. We then attended a series of assemblies and after much litigation the Diabetes Awareness group was able to receive some funding to assist with our future endeavors.

Creating a Web Site: This was a very difficult task for our group being that none of us had any prior experience in web design. We had to start from the beginning. My first course of action was to try and find a company online who could assist us in creating our website. This option turned out to be way to expensive and unnecessary. My second course of action was to try creating a site with HTML, which turned out to be a nightmare with no experience or knowledge on the subject. I thus found a viable option number 3: Iweb on my mac! This worked seamlessly. I simply created the site with the program and then registered a domain name for our group with GoDaddy.com. Then I masked the Iweb domain address to show the new Godaddy registered address. Our site is now up and running and can be seen at

www.DiabetesAwarenessGroup.org

Group Meetings: If our group was going to accomplish anything we were going to have to have regular group meetings in which we could discuss the direction and progress of our group. After contacting the other group members we decided to meet on Thursday afternoons. I then

went to the reservations office in the U of U student union and requested a room for Thursday afternoons in the union. We were soon granted a room reservation and our group meetings were under way.

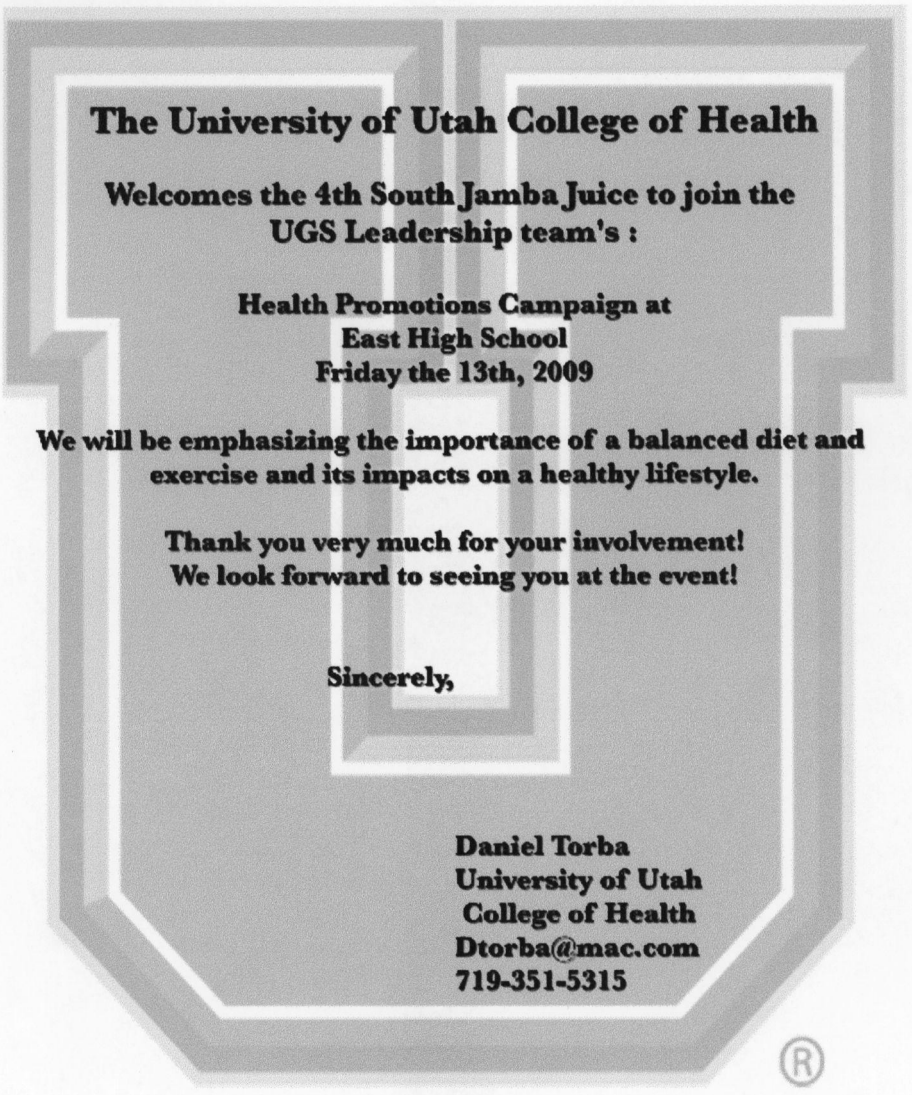
RESULTS

The Diabetes Awareness Group has been able to accomplish a lot in its first year as a student group. Even those endeavors in which we weren't successful, we were able to learn something to help the group grow. The Diabetes Awareness Group has been able to work with a variety of community partners:

ABC KiddyWorld: The Diabetes Awareness Group's first community outreach was done at ABC KiddyWorld. Our community partner there was Jamie Ney. ABC kiddyWorld is a pre/Kindergarten school in Provo. The Diabetes Awareness Group first had the idea of teaching the kids about diabetes by presenting a power point and Jamie said there would be no way the kids would be able to sit through that. Thus we took a very different approach and made it a more interactive experience. We tried to teach them the importance of eating healthy by having the kids color a sheet filled with foods, but only the good foods. Hence ice cream would not be colored. To teach the importance of exercise we played games that involved moving around and danced to show that exercising can be fun. All in all our meetings with Jamie Ney have helped us to have a much better experience working with Pre-school and Kindergarten level kids.

EAST HIGH SCHOOL: After working with Pre-School and Kindergarten level kids we decided we would like to work with older kids and came up with the idea of putting on a Health Fair. I contacted Elvena Brady who teaches the Alternative Program at East High School and spoke to her about our intended project. She approved and told me we could do it as long as we taught all 4 of her classes. Elvena asked if we could finish our presentation with a discussion on

college promotion. I thought this would be a good finish and I went to meet up with the group to discuss our outline. We decided that the best way to organize our presentation would be to prepare a PowerPoint presentation. We would split the PowerPoint into three components: Exercise, Nutrition, and College Promotion. After my discussion with Ellie I knew that because we were going to be teaching the alternative program a PowerPoint would not suffice in holding students' attention and that we were going to have to *jazz* up our presentation. My first idea was to provide a healthy snack alternative for everyone; being that our presentation was on health I found it very fitting. I settled on the idea of providing Jamba Juice for everyone and was then off to find donations. I stopped at the 4th south Jamba Juice and spoke with Chris, the manager. He liked our idea of putting on a health fair but wanted me to provide him with something a little more official..."Draw me up something nice" he said. I few days later I gave him this flyer.



Chris appreciated the flyer and was very generous to help with our cause. He said he would donate 60 miniature Jamba Juices in a variety of flavors. I thanked him and set up arrangements to have them picked up on the 13th.

Jamba Juice… PowerPoint… Still something was missing to make our project complete. We decided to incorporate a game where the students could get involved and answer questions

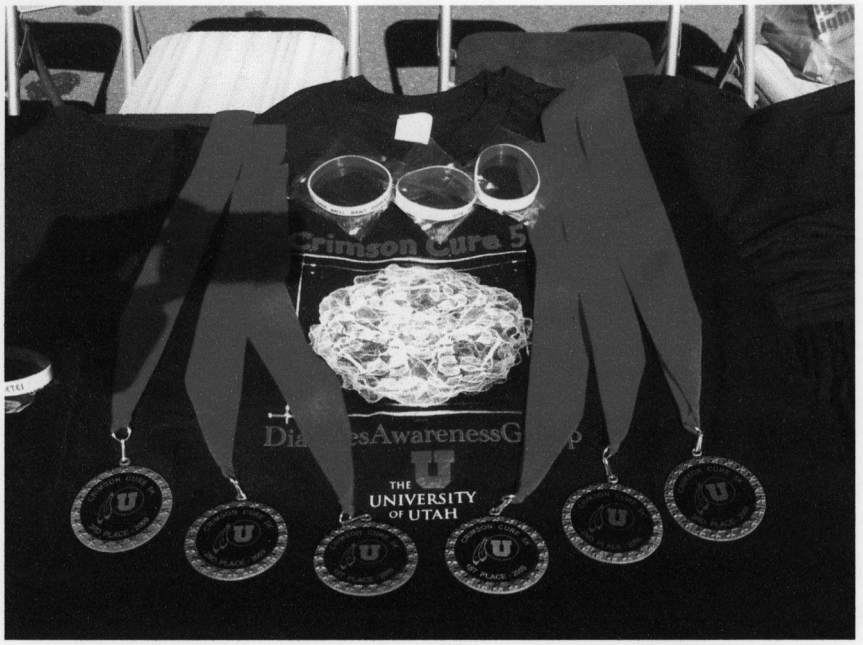
related to their health. What better way to start our presentation on health and exercise then to incorporate a game where you are moving around and having fun! The Friday the 13th health fair at East High School was a great experience for me as I was able to build my leadership skills all while hopefully impacting the eating and exercise habits of 60 students. Diabetes, Cardiovascular Disease, and Obesity are serious health concerns and it is my hope that we can all be leaders in the fight towards prevention.

Sorenson Multi-Cultural Center: I have had the opportunity to coach Jr. Jazz high school basketball at the Sorenson Multi-Cultural Center and in doing so have tried to teach the importance of the Diabetes Awareness Group's mission. Along with teaching good sportsmanship and teamwork I have tried to teach the kids the benefits of the exercise basketball entails and how eating healthy and exercising regularly can help reduce your risk for serious diseases such as diabetes. Coaching has been a blast and now that the season is over I have remained involved at the Sorenson Multi-Cultural Center and am now helping out with the after school program for younger kids. We meet every Tuesday where I facilitate sports and games for the kids to partake in. Again I have tried to teach the kids the Diabetes Awareness Group's mission and the importance of engaging in physical activity on a daily basis.

REFLECTION

The Diabetes Awareness Group has been both a lot of fun and a lot of work. Even though we were not successful in all of our endeavors I think it is important to reflect upon those endeavors so that you can learn from your mistakes and do better the next time. As a part of the Diabetes Awareness Group's mission we incorporated a fundraiser to help raise money for diabetes research. We came up with the idea of hosting a 5k in that not only could it help raise money but it would get people out exercising as well. I was ecstatic to start preparing for the race! Being that I had never hosted a 5k before or even participated in one I knew there was a lot of research and work ahead of me. Still inexperienced and all I was determined to make the race successful. In reflecting upon the 5k I have come to realize that just because I am excited about a project or idea doesn't mean others will necessarily be exuberant about that idea as well. This quickly became our biggest issue in preparing for the 5k... Advertising! We spent so much time preparing and ensuring the success of the 5k that we forgot that advertising and getting people to participate is the most important factor in our success. We also drastically underestimated the cost of hosting a 5k run/race without having any sponsors. There were a lot of expenses: Park Reservation fee- $150, Insurance to reserve the park- $500, Equipment- $150, T-shirts and medals- $300. This is just to name a few. Just to break even we would have had to have 50-60 participants show up for the race and thus we lost money. We actually had a fairly decent turn out being that it was our first race and welcomed about 40 people! The Diabetes Awareness Group was at Sugarhouse Park early with information on diabetes, exercise, and diet and handed out water to those that arrived. It was an extremely hot day outside and we surprised to see so many people do so well in the race! The day was a lot of fun and though we lost money we feel

that we were successful none-the-less in that we brought a group of peers together and shared our message about health… and that is what our group is all about!!

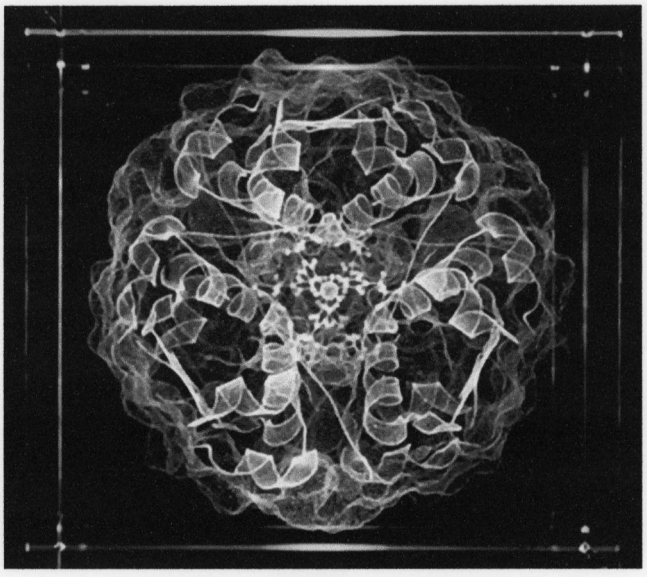


SUSTAINABILITY

One of the stipulates in creating the Diabetes Awareness Group was that we make it sustainable. For me this was an easy solution. The group is run by its officers each of whom is dedicated to the purpose and mission of the group. If one of those officers were to leave the group, it is their responsibility to ensure that a replacement officer has been found so that the group can continue running. Thus far this has not been an issue as there has been plenty of dedicated and passionate people wanting to volunteer and help out! It is my hope that the Diabetes Awareness Group will continue to grow and be successful after I am gone, and that the community in which we are serving will be healthier one in their eating and exercising decisions because we were there!

APPENDIX

Many people with diabetes take insulin to control their blood sugar (glucose). Insulin cannot be taken by mouth because it would be destroyed by digestion. Instead, most people who need insulin take insulin shots. Someday people with diabetes may no longer need needles or shots to take insulin; researchers are testing news ways to get insulin into the bloodstream.



Diabetes is caused by either the body not producing insulin, or cells not responding to it. In the 1920's it changed from a deadly illness to one that we live with, thanks to the Nobel-winning team of Banting, Best, MacLeod and Collip, who discovered how insulin works, learned to extract it, then gave away their patent so lives could be saved.

The data for this sculpture was kindly provided by Dr. G. David Smith, emeritus of the Hospital for Sick Children, Toronto, Canada.

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